1. Find a parametrization for the line of intersection of the planes \( x + 2y + 3z = 6 \) and \( x - y = 0 \). Sketch.

2. The curves \( t \hat{i} + t^2 \hat{j} + t^3 \hat{k} \) and \( \sin(t) \hat{i} + \sin(2t) \hat{j} + t \hat{k} \) intersect at the origin. Find the angle of intersection.

3. Find the limit of \( \frac{xy^3}{x^4 + 2y^4} \) as \( (x, y) \to (0, 0) \) or show that the limit fails to exist.

4. Suppose \( f \) is a differentiable function of \( x \) and \( y \) and \( g(u, v) = f(e^u + \sin v, e^u + \cos v) \). Use the table of values to find the directional derivative of \( g \) at the origin along the main diagonal.

   \[
   \begin{array}{c|cccc}
   (x, y) & f & g & f_x & f_y \\
   \hline
   (0, 0) & 2 & 3 & 4 & 5 \\
   (1, 2) & 6 & 7 & 8 & 9 \\
   \end{array}
   \]

5. Integrate \( \frac{x}{1 + xy} \) over the unit square \([0, 1] \times [0, 1]\).